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STANDARD FORM NO. 64

~~SECRET~~ [redacted]

Eng-8-78 25X1

Office Memorandum • UNITED STATES GOVERNMENT

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TO : The Files DATE: 18 June 1958

FROM : [redacted] 25X1

SUBJECT: Summary, [redacted] Tests [redacted] 25X1 25X1 25X1

1. This is an interim report on the [redacted] tests conducted from [redacted] from 5 to 17 May 1958 and 29 May 1958. A more comprehensive report will be written at a later date. The tests included the following types of operation: 25X1 25X1

a. On the air QFM transmission from the transmit terminals [redacted] 25X1

(1) Receive RF and receive data terminals connected back to back by a drop cord

(2) Receive RF and receive data terminals remoted over 50 miles of phone line

(3) Receive RF and receive data terminals remoted over a microwave path of 120 miles

b. Phone line operation from transmit data terminals to the receive data terminals

c. Audio tone modulation operation from [redacted] [redacted] 25X1 25X1

d. Attempted one-hour continuous operation

2. A total of 177 transmissions of one minute duration were made in performance of these tests; 152 transmissions were received. The 25 transmissions missed are accounted for below. For these transmissions, a 12 second sample was printed out either on the high speed reperforator or Page printer. This sample gave 320 words of copy out of the 1600 possible or 1920 characters. The overall error rate for the 152 transmissions was 1.08%. A [redacted] log for the 11 days of operation is attached (Attachment A); 147 transmissions were received using the [redacted] 115 of these were with successful automatic starts, and 32 successful semi-automatic starts. Five shots were received with the [redacted] not in the circuit. The error rate for these was 1.98%; for the 115 automatic starts the error rate was 1.33% and for the 32 semi-automatic starts, the error rate was .18%. A total of 15 unsuccessful crypto starts were made. These are indicated in the unsuccessful start column. This accounts for 60% of shots missed. The remaining 10 shots not received are accounted for below. 25X1 25X1 25X1

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a. Five bad starts due to operator error. Three at [redacted] CONFIDENTIAL 25X1 25X1

b. One bad start due to failure of receive data terminal (demultiplex drawer - low pulses from No. 2 ring counter)

c. Two transmissions not received - unexplained

d. One transmission not made - trouble at transmit data terminal

e. One phone line operation unsucessful - poor line

Twenty per cent of the missed shots were due to operator error. The two phone line shots between data terminals resulted in a 2.8% error rate. An attempt was made to receive audio tone modulation transmission [redacted] but was unsuccessful. Continuous operation for one hour was tried four times as follows: 25X1

1) 23 May - Lost [redacted] sync after 30 minutes - received signal was not manually tracked. 25X1

2) 23 May - After 35 minutes the [redacted] equipment alarm indicated loss of crypto sync. 25X1

3) 29 May - The transmitter circuit breaker opened after 30 minutes. This was due to operator error [redacted] 25X1

4) 29 May - [redacted] alarm sounded after 40 minutes 25X1

3. Attachment B is a copy of the troubles encountered at the transmit terminals. At [redacted] the following troubles occurred during the test period. Also listed are the troubles which occurred during the week of demonstration. 25X1

TEST PERIOD

1. In the Receive cabinet - No. 1 receiver - open injection cable; there was also loose coupling between the RF autotone and the RF gain control - corrected after test and demonstration.

2. Time cabinet - In the control drawer there was a bad contact on channel 5 selector push-button - corrected after test. The 28-volt source relay shorted - replaced.

3. Five channel recognition drawer - relay too sensitive - replaced

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4. Parity cabinet - 100 volt DC power supply - bad rectifier tube 5U4 - replaced

5. Pulse Cabinet - Two 5814 and one 5725 tubes - low emission - corrected after tests

6. Punch cabinet - Lower punch clogged twice - repaired. Feed punch on soroban band reperforator adjusted

7. [redacted] - in buffer stage - tape jammed due to transport failure - repaired. In message format cabinet - block ~~back~~ space pulley belt came off causing improper block spacing - repaired. The format circuitry failed to follow format of incoming messages as to line feed. Still uncorrected. In the printer itself, the ink ribbon was a continual problem - the transport is inadequate wearing out the ribbon rapidly. One of the magnistor plug-in units burned out - replaced. The power drain caused a circuit breaker to open several times - 19.6 amps is the normal drain for the [redacted] 25X1 25X1

DEMONSTRATION WEEK

1. In the receive cabinet - receiver No. 1 had a shorted auto-tuned motor governor - motor replaced. In the 3.5 mc IF section - 5814 tube bad - low emission - replaced.

2. Receive data terminal - receive audio drawer A - tubes 5751 and 5814 in channel 2 - low emission - replaced. Minus 100 volt power supply - two 5U4 tubes - low emission. Plus 100 volt power supply - 5U4 filament open - replaced.

4. No conclusions can be attempted here but the following comments apply:

a. The error correction circuits appear to work but a reliable check on the capability of this feature was not made. The 12 second samples were not sufficient data. A special prepared message could be transmitted and the entire message could be printed out while observing the error correction lights. Then, the received message could be correlated with the original. Another possibility would be to make two shots in succession - one with the correction switched in and one with the error correction switched out.

b. The reliability of the [redacted] is still an unknown quantity. It was possible to operate with the semi-automatic position for three hours at one time without a new start. However, during two of the hour checks, the [redacted] alarm sounded cutting the transmissions off after 35 and 40 minutes. 25X1 25X1

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c. In order to maintain continuous [redacted] communications, it is necessary that the received signal be manually tracked to stay in sync with the transmitter. 25X1

d. Another factor to be considered is that it is possible with the [redacted] to get immediate new starts in the event of crypto failure. 25X1

[redacted] 25X1

Attachments as above

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[redacted] LOG - 11 days operation

ATTACHMENT A

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[redacted]

I No. of 1 minute transmissions received using [redacted] - 147 25X1
(115 Successful [redacted] to starts, 32 semi.)
Total No. of tra[redacted]missic[redacted] made - 177
II No. of 1 hour transmissions receiver - 4

25X1

DATE MAY	TOTAL SHOTS	REC'D SHOTS	SUCCESSFUL START Auto.	SUCCESSFUL START Semi-Auto	UNSUCCESSFUL START Auto.	UNSUCCESSFUL START Semi-Auto.	REMARKS
5	21	19	9		1	3	2 bad starts due to operator error. (5 transmissions made at start without [redacted] 1 bad start due to failure of Rec. Data Terminal. 25X1
6	20	14	8	6	1	4	1 no signal received due to [redacted] changeover [redacted] from internal power supply to external power supply - operator error. 25X1 25X1
7	17	15	5	10	1	1	Operated in semi-automatic 1½ hours one time, 3 hours at another time. One transmission made over phone lines between Data Terminals using [redacted] - successful auto starts. 25X1
9	14	13	9	4		1	One transmission over phone lines using [redacted] successful. 25X1
10	18	16	5	11		2	
12	17	16	15	1		1	Semi-automatic starts not used after this date. Receive Terminals remated by phone links for 9 transmissions - all 9 were with successful starts.
13	16	13	13	Not Used			3 transmissions not received. 1 due to Ferranti Reader 2 unexplained.
14	13	12	12	" "			Operation over phone lines attempted between Data Terminals. Quality of line was poor. Not considered unsuccessful start (1).

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DATE MAY	TOTAL SHOTS	REC'D SHOTS	SUCCESSFUL START Auto.	SUCCESSFUL START Semi-Auto.	UNSUCCESSFUL START Auto.	UNSUCCESSFUL START Semi-Auto.	REMARKS
16	15	14	14	Not Used			Operator error - wrong channel. (1)
17	16	15	15	"	"		Last transmission missed. (1) Operator error.
29	10	10	10	"	"		
23	2	2	2				Last [redacted] signal after 30 minutes of first attempt [redacted] alarm after 35 minutes of second attempt.
29	2	2	2				[redacted] Transmitter circuit breaker-out - operator error-35 min. [redacted] alarm after 40 minutes of second attempt.

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TO: [redacted] [redacted] DATE 27 May 1958 ILLEGIB

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SUBJECT: IMPERFECT TRANSMISSIONS DURING [redacted] TESTS

FROM: [redacted] 25X1

25X1

25X1

In going over the logs from [redacted] covering the [redacted] tests during the period of 5 May to 23 May the following imperfect transmissions were noted: 25X1

6 May	0900	Transmitter detuned
13 May	1215	Trouble
16 May	2230	Intermediate power amplifier of transmitter detuned
23 May	1045	"Automatic" of [redacted] not working

25X1

Conceivably there could have been more occasions but in times of trouble one concentrates on making the equipment work rather than on getting full details in the log. In checking with [redacted] the engineer in charge at the test site, the above data seems realistic and reflects the actual amount of trouble during the test period. It must be remembered that the tests are being run by development type personnel who normally have a different outlook from those who make successful operators. 25X1

[redacted] 25X1

[redacted] 25X1

ATTACHMENT B

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